

THERMAL INTERFACE MATERIAL  
AND SOLDER PREFORMS

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation-in-part application of  
U.S. Application No. 10/151,741, filed May 20, 2002, <sup>Pat. 6,653,741</sup> and  
further claims the benefit of U.S. Provisional Application No.  
60/293,457, filed May 24, 2001, and U.S. Provisional  
Application No. 60/306,218, filed July 18, 2001.

BACKGROUND OF THE INVENTION

10 Thermal interface materials (TIMs) are critical to  
protect active semiconductor devices, such as microprocessors,  
from exceeding the operational temperature limit. They enable  
thermal bonding of the heat generating device (e.g., a silicon  
semiconductor) to a heat sink or a heat spreader (e.g, copper  
15 and/or aluminum components) without presenting an excessive  
thermal barrier. Different TIMs may also be used in the  
assembly of other components of the heat sink or the heat  
spreader stack that comprise the overall thermal impedance  
path.

20 Formation of a small thermal barrier is an important  
property of a TIM. The thermal barrier can be described in  
terms of effective thermal conductivity through the TIM and is  
preferably as high as possible. The effective thermal  
conductivity of the TIM is primarily due to the interfacial  
25 heat transfer coefficient as well as the (intrinsic) bulk  
thermal conductivity of the TIM. A variety of other  
properties are also important for a TIM depending on the  
particular application, for example: an ability to